CLAIMS

What is claimed is:

1. A method for automated picking of animal cell colonies using an apparatus, comprising:

a) providing a picking head comprising a plurality of hollow pins, the picking head being movable over the apparatus using positioning motors;

b) placing a sample container including a plurality of animal cell colonies held in a medium onto the apparatus, and also a dispensing container;

c) using machine vision and image processing to identify animal cell colony locations in the sample;

d) moving the picking head to above the sample container;

e) picking an animal cell colony by aligning one of the hollow pins with one of the animal cell colony locations, introducing a distal end of the hollow pin into the medium, and aspirating the animal cell colony at that location into the hollow pin; and

f) dispensing the picked animal cell colony by moving the picking head to above the dispensing container and expelling the picked animal cell colony into the dispensing container.

2. The method of claim 1, wherein the picking step comprises repeating the aligning and aspirating steps for multiple ones of the hollow pins to pick multiple ones of the animal cell colonies.

3. The method of claim 1, wherein the dispensing container comprises an array of wells separated by a characteristic spacing and the hollow pins are also arranged with the characteristic spacing so that the expelling step can be performed in parallel for all the hollow pins.

4. The method of claim 1, wherein the animal cell colonies are adhered to the sample container, and wherein after the introducing step the distal end of the pin is agitated relative to the sample container so as to detach the animal cell colony at that location prior to performing the aspirating step.

5. The method of claim 1, wherein the animal cell colonies are stained with a contrast enhancing agent to assist the image processing.

6. The method of claim 1, wherein the animal cell colonies are stained with a fluorescent agent to assist the image processing.

7. The method according to claim 1, wherein the plurality of animal cell colonies comprise or express a biological molecule of interest.

8. The method of claim 7, wherein the biological molecule of interest is selected from the group consisting of: a peptide, a polypeptide, a nucleic acid, or a glycosylated or unglycosylated protein.

9. The method according to claim 8 wherein the protein of interest is a biopharmaceutical protein.

10. An apparatus for picking animal cell colonies comprising:

an apparatus bed for arranging a sample container comprising a plurality of animal cell colonies held in a medium;

a camera for capturing images of the animal cell colonies;

image processing software for identifying animal cell colony locations from captured images; and

a picking head movable around the apparatus bed using positioning motors to animal cell colony locations identified by the image processing software, wherein the picking head comprises a plurality of hollow pins connected through fluid conduits to

a pressure controller that is operable to aspirate quantities of the medium from the sample container into the hollow pins, to retain the medium and to expel it when required, thereby allowing animal cell colonies to be picked from the medium.

11. The apparatus of claim 10, wherein the picking head further comprises a drive mechanism for causing lateral oscillation of distal ends of the pins to facilitate detachment of adherent animal cell colonies.

12. The apparatus of claim 11, wherein the drive mechanism is configured to cause rotary motion of the distal ends of the pins.

13. The apparatus of claim 10, wherein the hollow pins are arranged in a characteristic spacing matched to a well plate standard spacing.

14. Use of the apparatus according to claim 10 for identifying an animal cell colony comprising or expressing a biological molecule of interest.

15. Use according to claim 14, wherein the biological molecule of interest is selected from the group consisting of: a peptide, a polypeptide, a nucleic acid, or a glycosylated or unglycosylated protein.

16. Use according to claim 14, wherein the glycosylated or unglycosylated protein of interest is a biological molecule.